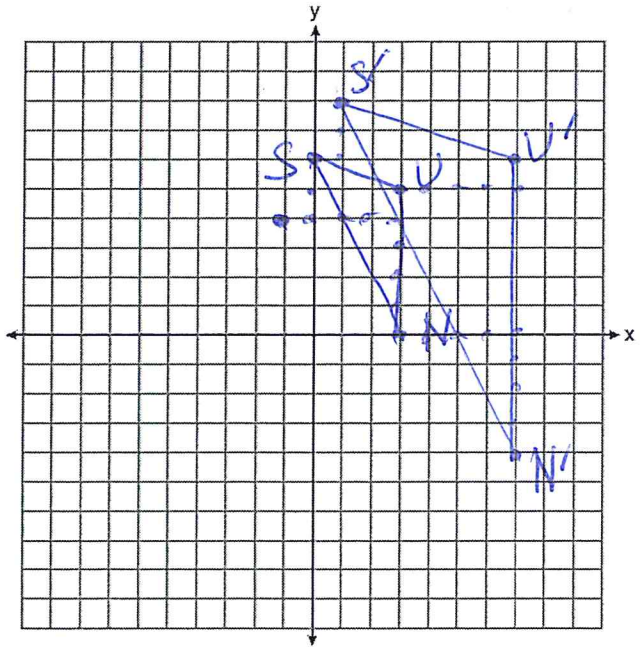
Name Schlansky
Mr. Schlansky

Date _____
Geometry

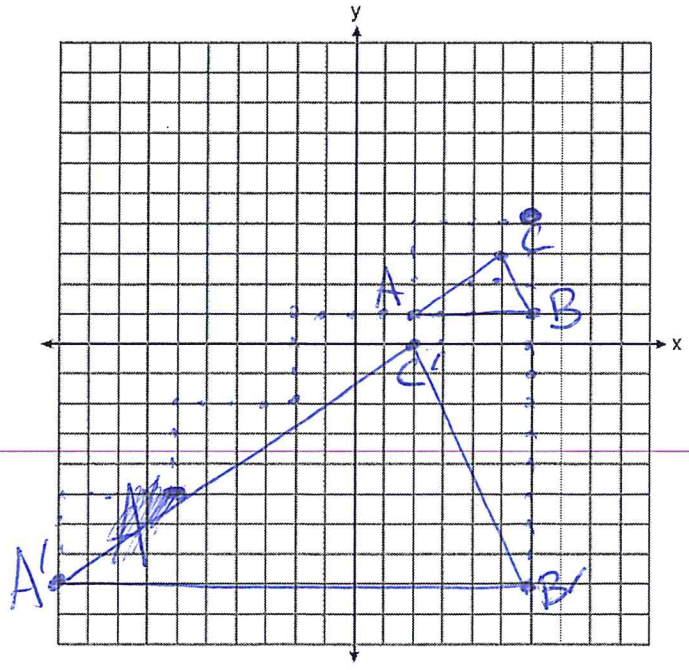
Similar Triangles Review Sheet

1. Triangle SUN has coordinates $S(0,6)$, $U(3,5)$, and $N(3,0)$. On the accompanying grid, draw and label $\triangle SUN$. Then, graph and state the coordinates of $\triangle S'U'N'$, the image of $\triangle SUN$ after a dilation of 2 centered at (-1,4).

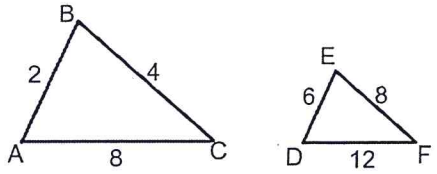


S'(1,8)
U'(7,6)
N'(7,-4)

2. Triangle ABC has coordinates $A(2,1)$, $B(6,1)$, $C(5,3)$. What is the image of this triangle after a dilation of 4 centered at (6,4). Graph both the image and the pre image.



3. Determine whether the following triangles are similar. Explain your answer.



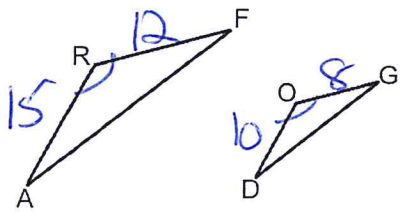
Determine if the sides are in proportion.

$\frac{2}{6} = \frac{4}{8} = \frac{8}{12}$

$\frac{1}{3} = \frac{1}{2} = \frac{2}{3}$ ✗

No, the sides are not in proportion

4. In the diagram below, $\overline{AR} = 15$, $\overline{RF} = 12$, $\overline{DO} = 10$, $\overline{OG} = 8$, and $\angle ARF \cong \angle DOG$. Must $\Delta ARF \sim \Delta DOG$? Explain your answer.



$\frac{15}{10} = \frac{12}{8}$

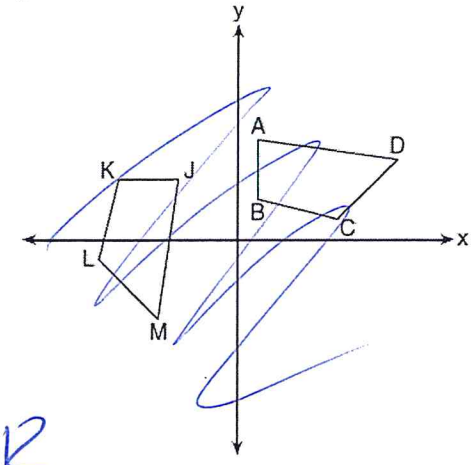
$\frac{3}{2} = \frac{3}{2}$ ✓

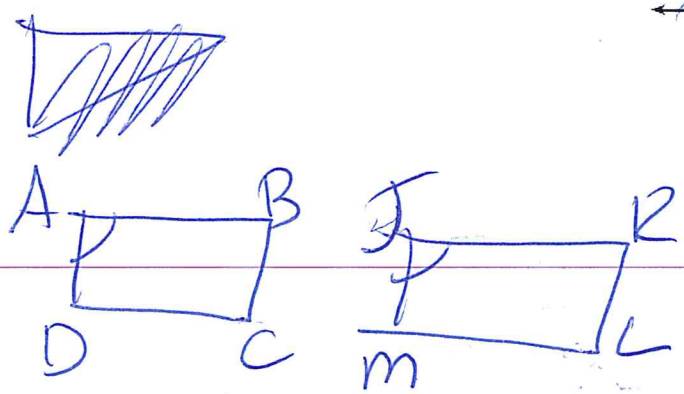
Yes, SAS. Two pairs of corresponding sides are in proportion and the angle between them is congruent.

5. In the diagram below, a sequence of rigid motions maps *ABCD* onto *JKLM*.

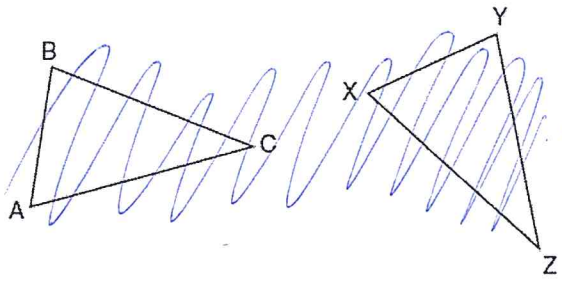
Which of the following statements must be true?

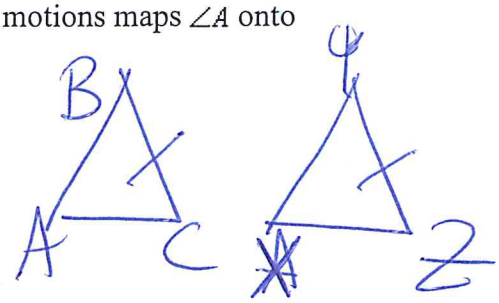
1) $\angle L \cong \angle B$ ✗
2) $\overline{JK} \cong \overline{AC}$ ✗
3) $\angle A \cong \angle J$ ✓
4) $\overline{JM} \cong \overline{AB}$ ✗





6. In the diagram below of $\triangle ABC$ and $\triangle XYZ$, a sequence of rigid motions maps $\angle A$ onto $\angle X$,
$\angle C$ onto $\angle Z$, and $\overline{AC}$ onto $\overline{XZ}$.



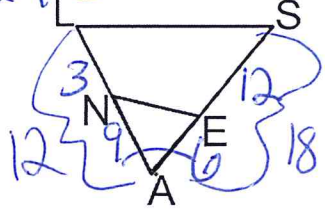


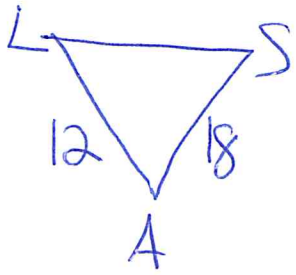
Determine and state whether $\overline{BC} \cong \overline{YZ}$. Explain why. Yes, they correspond.

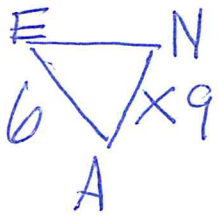
Determine and state whether $\angle A \cong \angle Y$. Explain why. No, they don't correspond.

7. In triangle SAL, N is on $\overline{LA}$, and E is on $\overline{AS}$ so that $\angle AEN \cong \angle L$.
If $\overline{AE} = 6$, $\overline{ES} = 12$, and $\overline{ES} \cong \overline{AL}$, find $\overline{NL}$.

12-9=3







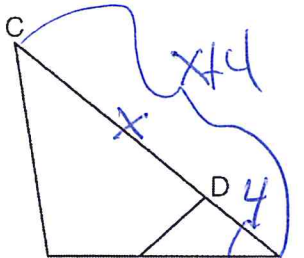
$\frac{12}{6} = \frac{18}{x}$

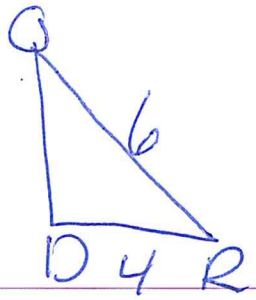
$\frac{12x}{12} = \frac{108}{12}$

$x = 9$

$\overline{NL} = 3$

8. In triangle CHR, O is on $\overline{HR}$, and D is on $\overline{CR}$ so that $\angle H \cong RDO$.
If $RD = 4$, $RO = 6$, and $OH = 4$, what is the length of $\overline{CD}$?





$\frac{x+4}{6} = \frac{10}{4}$

$4(x+4) = 60$

$4x + 16 = 60$

$-16 \quad -16$

$\frac{4x}{4} = \frac{44}{4}$

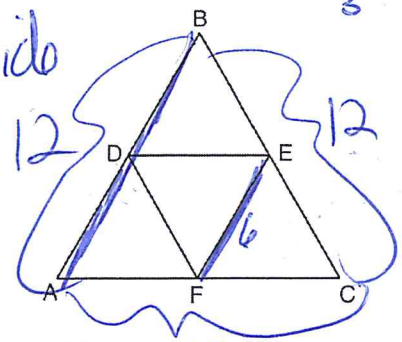
$x = 11$

$CD = 11$

9. In the diagram below, the vertices of $\triangle DEF$ are the midpoints of the sides of equilateral triangle ABC, and the perimeter of $\triangle ABC$ is 36 cm.

$\frac{36}{3}=12$

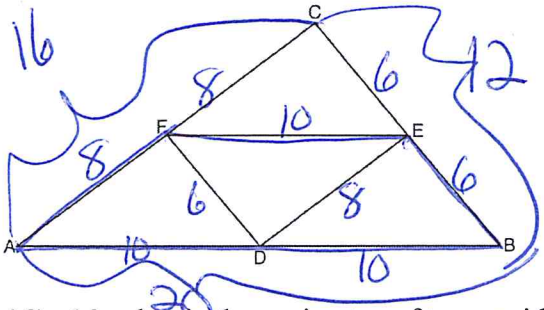
2(midsegment) = opposite side



What is the length, in centimeters, of $\overline{EF}$?

1) 6
2) 12
3) 18
4) 4

10. In the diagram of $\triangle ABC$ shown below, D is the midpoint of $\overline{AB}$, E is the midpoint of $\overline{BC}$, and F is the midpoint of $\overline{AC}$.



20+8+10+6
44

If $AB = 20$, $BC = 12$, and $AC = 16$, what is the perimeter of trapezoid $ABEF$?

1) 24
2) 36
3) 40
4) 44

11. Triangle ABC shown below is a right triangle with altitude $\overline{AD}$ drawn to the hypotenuse $\overline{BC}$.

If $BD = 2$ and $DC = 10$, what is the length of $\overline{AB}$?

1) $2\sqrt{2}$
2) $2\sqrt{5}$
3) $2\sqrt{6}$
4) $2\sqrt{30}$

$\frac{H}{L}=\frac{L}{S}$

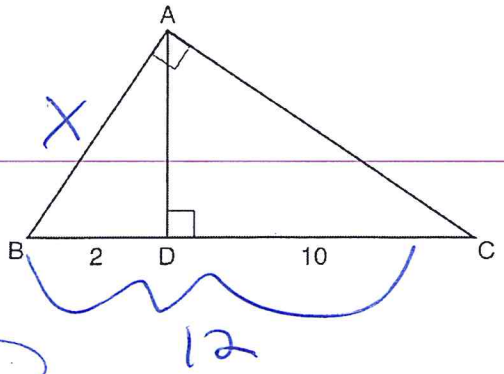
$\frac{12}{x}=\frac{x}{2}$

$\sqrt{x^2}=\sqrt{24}$

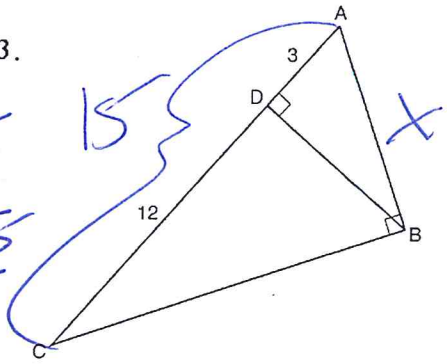
$x=\sqrt{24}$

$\sqrt{4}\sqrt{6}$

$x=2\sqrt{6}$



12. In right triangle ABC shown in the diagram below, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$, $CD = 12$, and $AD = 3$.



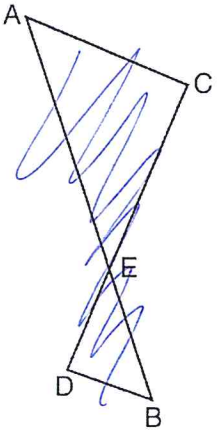
What is the length of $\overline{AB}$?

1) $5\sqrt{3}$
2) 6
3) $3\sqrt{5}$
4) 9

13. As shown in the diagram below, $\overline{AB}$ and $\overline{CD}$ intersect at E, and $\overline{AC} \parallel \overline{BD}$.

Given $\triangle AEC \sim \triangle BED$, which equation is true?

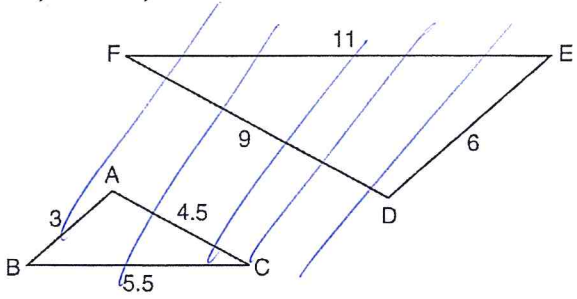
1) $\frac{CE}{DE} = \frac{EB}{EA}$
2) $\frac{EC}{AE} = \frac{BE}{ED}$
3) $\frac{AE}{BE} = \frac{AC}{BD}$
4) $\frac{ED}{EC} = \frac{AC}{BD}$



14. In the diagram below, $\triangle DEF$ is the image of $\triangle ABC$ after a clockwise rotation of 180° and a dilation where $AB = 3$, $BC = 5.5$, $AC = 4.5$, $DE = 6$, $FD = 9$, and $EF = 11$.

Which relationship must always be true?

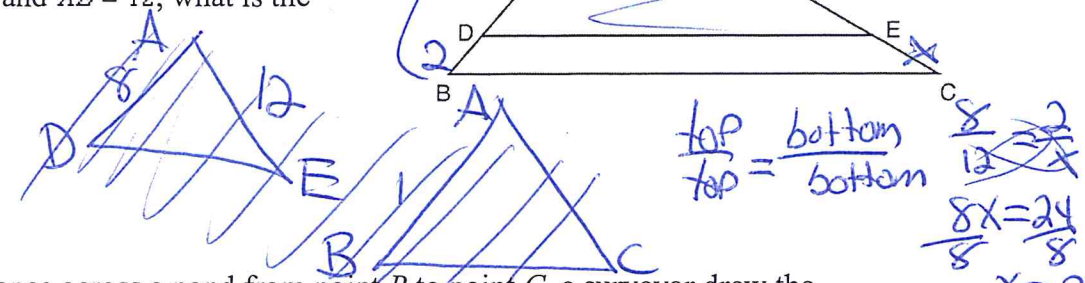
1) $\frac{m\angle A}{m\angle D} = \frac{1}{2}$
2) $\frac{m\angle C}{m\angle F} = \frac{2}{1}$
3) $\frac{m\angle B}{m\angle E} = \frac{m\angle C}{m\angle F}$
4) $\frac{m\angle A}{m\angle C} = \frac{m\angle F}{m\angle D}$



15. In the diagram of $\triangle ABC$ shown below, $\overline{DE} \parallel \overline{BC}$.

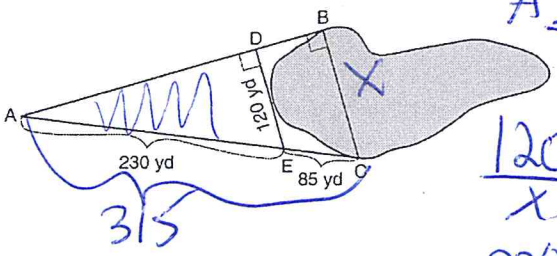
If $AB = 10$, $AD = 8$, and $AE = 12$, what is the length of $\overline{EC}$?

1) 6
2) 2
3) 3
4) 15

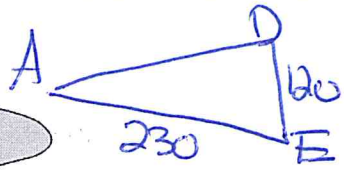


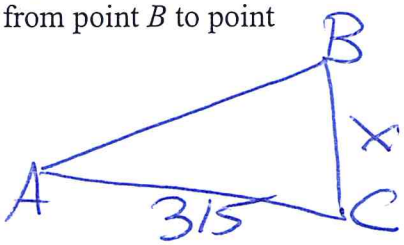
$\frac{\text{top}}{\text{top}} = \frac{\text{bottom}}{\text{bottom}}$ $\frac{8}{12} = \frac{2}{x}$ $\frac{8x}{8} = \frac{24}{8}$ $x = 3$

16. To find the distance across a pond from point B to point C, a surveyor drew the diagram below. The measurements he made are indicated on his diagram.
Use the surveyor's information to determine and state the distance from point B to point C, to the *nearest yard*.



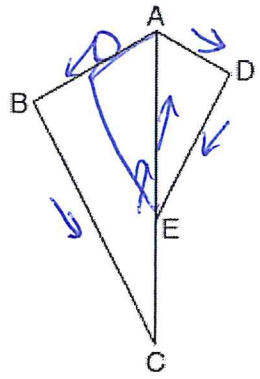
315





$\frac{120}{x} = \frac{230}{315}$ $\frac{230x}{230} = \frac{37{,}800}{230}$ $x = 164$

17. Describe a sequence of transformation that would map $\triangle ADE$ onto $\triangle ABC$. What is the relationship between $\triangle ADE$ and $\triangle ABC$? Explain your answer.



opposite orientation
reflection

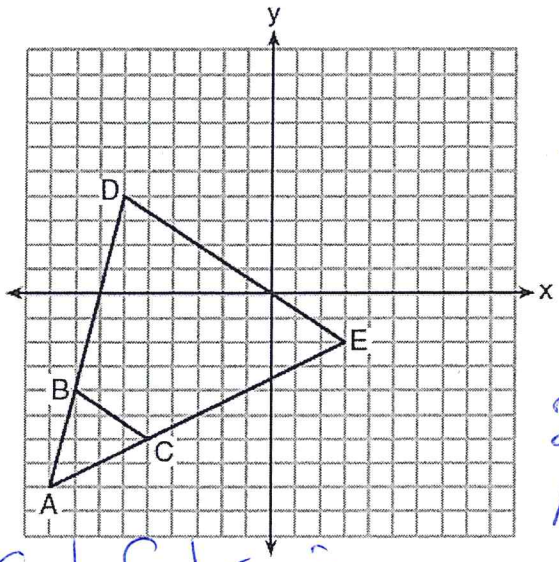
scale factor = $\frac{\text{image}}{\text{original}}$

the invariant point is the center of dilation

1) Reflect $\triangle ADE$ over $\overline{AE}$ followed by dilating $\triangle ADE$ by a scale factor of $\frac{AB}{AD}$ centered at A.

2) $\triangle ADE \sim \triangle ABC$. A reflection and dilation preserve angle measure producing a similar figure.

18. Triangle *ABC* and triangle *ADE* are graphed on the set of axes below.
Describe a transformation that maps triangle *ABC* onto triangle *ADE*. Explain why this transformation makes triangle *ADE* similar to triangle *ABC*.

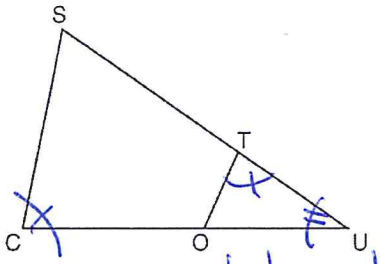


1) Dilate $\triangle ABC$ by a scale factor of $\frac{AD}{AB}$ centered at A.

2) A dilation preserves angle measure producing a similar figure.

Scale factor = $\frac{\text{image}}{\text{original}}$

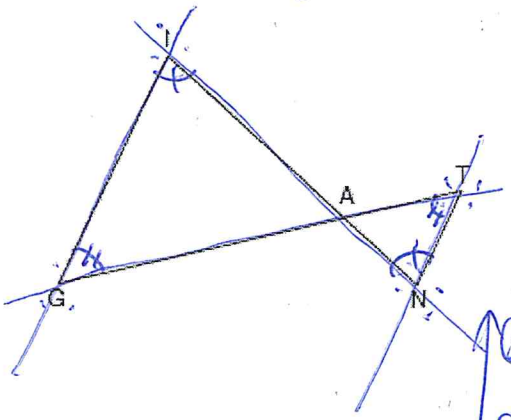
19. In $\triangle SCU$ shown below, points *T* and *O* are on $\overline{SU}$ and $\overline{CU}$, respectively. Segment *OT* is drawn so that $\angle C \cong \angle OTU$.
Prove: $\overline{SC} \bullet \overline{OU} = \overline{OT} \bullet \overline{SU}$



Statements	Reasons
① $\angle C \cong \angle OTU$	① given
② $\angle OUT \cong \angle OUT$	② Reflexive Property
③ $\triangle SCU \sim \triangle OTU$	③ AA
④ $\frac{SC}{SU} = \frac{OT}{OU}$	④ CSSTIP
⑤ $SC \cdot OU = OT \cdot SU$	⑤ Cross products are equal

20. In the diagram below, $\overline{GI}$ is parallel to $\overline{NT}$, and $\overline{IN}$ intersects $\overline{GT}$ at A.

Prove: $\frac{\overline{IA}}{\overline{AN}} = \frac{\overline{IG}}{\overline{TN}}$ work backwards



Statements	Reasons
(1) $\overline{GI} \parallel \overline{NT}$	(1) given
(2) $\angle GIA \cong \angle TNA$, $\angle IGA \cong \angle ATN$	(2) parallel lines cut by a transversal create congruent alternate interior angles.
(3) $\triangle IGA \sim \triangle NTA$	(3) AA
(4) $\frac{IA}{AN} = \frac{IG}{TN}$	(4) CSSTIP

Spiral Review:
All transformations produce a congruent figure except for dilation.
Dilations multiply

21. The vertices of $\triangle JKL$ have coordinates $J(5,1)$, $K(-2,-3)$, and $L(-4,1)$. Under which transformation is the image $\triangle J'K'L'$ *not* congruent to $\triangle JKL$?

1) a translation of two units to the right and two units down
2) a counterclockwise rotation of 180 degrees around the origin
3) a reflection over the x-axis
4) a dilation with a scale factor of 2 and centered at the origin

not congruent

22. Which transformation would result in the perimeter of a triangle being different from the perimeter of its image?

1) $(x,y) \rightarrow (y,x)$
2) $(x,y) \rightarrow (x,-y)$
3) $(x,y) \rightarrow (4x,4y)$ — multiplication → dilation
4) $(x,y) \rightarrow (x+2,y-5)$